

DISCOVERY OF SHASTA SALAMANDERS IN ATYPICAL HABITAT

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The Shasta salamander, *Hydromantes shastae*, is a state-listed threatened species endemic to a small region of Shasta County north and northeast of Redding, California. Until recently, all documented Shasta salamander observations occurred within very specific physical habitats. All previously known sites, with the exception of 1 lava rock outcrop (Papenfuss and Cross¹ 1980), occurred within 200 m of limestone rock formations, although no surveys have been conducted beyond this distance (Olsen and Lewendal² 1999).

While conducting terrestrial mollusk survey work for the U.S. Forest Service during spring and fall 1999, we discovered 6 Shasta salamanders at 6 locations in areas considered atypical habitat. The terrestrial mollusk surveys are time-constrained level-of-effort searches consisting of 1-person-hour of search time per 4 ha of habitat and are conducted using two 20-minute "point searches" and one 20-minute "sample area." A point search consists of searching throughout the 4-ha survey area looking for terrestrial mollusks in appropriate microhabitats (e.g., duff, litter, down woody debris, rocks, talus). A sample area is an approximately 25-m² area within the 4-ha survey area, which encompasses several suitable microhabitats.

The Shasta salamander discovery site locations occurred within the Shasta Lake Ranger District in the Reynolds, Dead Horse, and Arbuckle Creek drainages, small tributaries to the Pit River arm of Shasta Lake (40°45'N, 122°09'W to 40°46'N, 122°06'W) (Fig. 1). These sites ranged from 2.4 to 6.4 km from the nearest limestone formations, located to the northeast at Brock Mountain and Grey Rocks.

Generally, habitats at the discovery sites were similar. However, each site had its own microhabitat characteristics. They were characterized as montane hardwood-conifer (Mayer and Laudenslayer 1988), dominated by an overstory of douglas fir, *Pseudotsuga menziesii*; canyon live oak, *Quercus chrysolepis*; and California black oak, *Q. kelloggii*. Understory vegetation consisted of sparse to moderate shrub and herbaceous growth including poison oak, *Toxicodendron*

¹ Papenfuss, T. and D. Cross. 1980. The status of the Shasta salamander (*Hydromantes shastae*) in the Mountain Gate and Cedar Creek areas of Shasta County. BLM Contract Report. Bureau of Land Management, Redding, California, USA.

² Olson, D.H. and P.C. Lewendal. 1999. Survey protocol for the Shasta salamander (*Hydromantes shastae*). Pages 65-101 in: D.H. Olson, editor. Survey protocols for amphibians under the survey and management provisions of the Northwest Forest Plan, Version 3.0, October 1999. USDA Forest Service R5/R6 and USDI Bureau of Land Management, Oregon, Washington, California, USA.

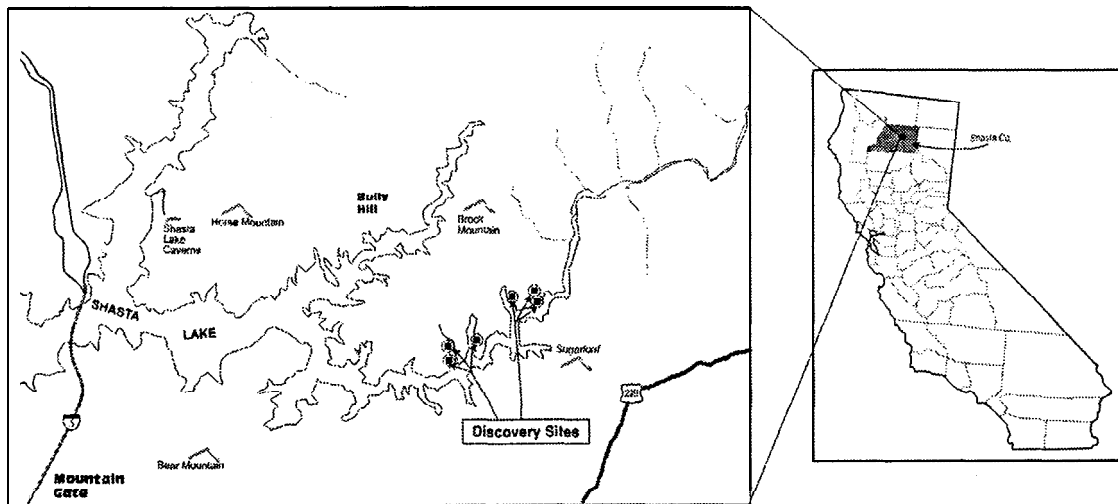


Figure 1. Shasta salamander, *Hydromantes shastae*, discovery site locations in atypical habitat, Shasta County, California.

diversilobum; snowdrop bush, *Styrax officinalis*; mock orange, *Philadelphus lewisii*; buckeye, *Aesculus californica*; five-finger fern, *Adiantum* sp.; sword fern, *Polystichum* sp., and various other annual grasses and forbs. Overstory canopy closure was dense, ranging from approximately 70 to 85%. Slopes at species discovery sites were steep (approximately 60-80%), with north, east, and northwest aspects. Terrestrial salamander microhabitats at these sites included moss, large and small woody debris, leaf litter, scattered rock, and occasional "rock-on-rock" (colluvium) pockets. No extensive talus slopes or other rocky sites occurred. Depending on the specific site, salamanders were found under down woody debris, rock/gravel, and leaf litter/duff. With the exception of 1 salamander found on rocky substrate, all salamanders were found on litter/duff substrate (i.e., the forest floor). The geologic formations within the discovery sites were all meta-sedimentary materials. No salamanders were measured; however, snout-vent length was estimated for all individual salamanders and ranged between 50 and 60 mm.

These discoveries may represent either populations isolated by the creation of Shasta Lake, or expanding populations from nearby limestone areas. These discoveries also demonstrate that within the known species range, Shasta salamanders occur in forested habitats not necessarily associated with limestone formations. Lack of prior observations of Shasta salamanders in these habitats may simply be due to a lack of survey effort resulting from assumptions regarding species habitat requirements.

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LITERATURE CITED

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